

# EXHIBIT F

**REPORT**  
**of the**  
**DANIEL J. MCGRAW AIRCRAFT CRASH**

**By:**

**Matthew D. Lykins AP, IA**

**April 29, 2016**

**Robson Forensic**  
**Engineers, Architects, Scientists & Fire Investigators**

## DANIEL J. MCGRAW AIRCRAFT CRASH

### REPORT

April 29, 2016

#### 1.0 INTRODUCTION

On May 6, 2014 Daniel McGraw (McGraw) was injured when the experimental aircraft he was piloting lost power and crashed in a field near the town of Crivitz, Wisconsin. The aircraft, a Lancair model MKII serial number 778, was built by Arthur P. Kinsler in 1999 and maintained by Superior Aviation prior to McGraw's crash. Federal Aviation Administration (FAA) Accident Incident Data System Report Block 33 states "Investigation revealed no hose on the fuel pump going to the engine".<sup>1</sup>

Robson Forensic Inc was retained to investigate this matter. The purpose of my investigation was to determine if the actions/inactions of Superior Aviation created dangerous conditions that caused or contributed to McGraw's crash.

Robson Forensic, Inc. invoices the work associated with this investigation at a rate of \$375.00 per hour. I have included a CV outlining my qualifications with this report as well as a history of my testimony.

Throughout my career as a certificated mechanic, inspector, repairman, technical instructor, commercial pilot and aviation safety auditor, I have owned, managed and operated several aviation maintenance facilities including FAA certified repair stations. I have developed and taught training courses for major airlines and repair station maintenance personnel. I also have developed FAA approved air carrier and repair station maintenance programs and manuals. These programs and manuals covered technical, operational, and safety policies and procedures. I have sat on aviation technical school advisory committees reviewing, evaluating, improving and modernizing training courses and curriculum subject areas to ensure new aviation maintenance technicians are prepared to meet industry demands. For more than 15 years I provided final technical exams and issued certificates to aviation technician applicants as a designed mechanic examiner (DME) on behalf of the FAA. I currently hold return-to-service authority as a FAA certified repair station inspector and as an Airframe and Powerplant (A&P) technician with Inspection Authorization (IA).

I may use the following materials as exhibits to illustrate testimony: All items referenced in section 2.0 Available Information below and all citations and footnoted items in this report.

---

<sup>1</sup> FAA Accident Incident Data System Report, ATQA Report Number AGL1314008.

## 2.0 AVAILABLE INFORMATION

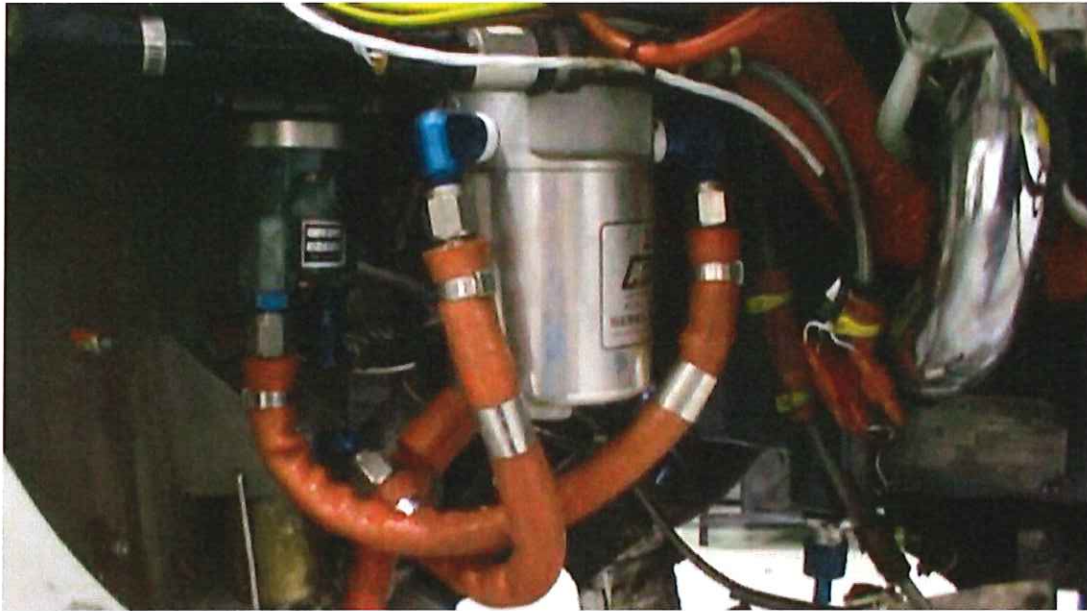
- 2.1 Certified copy of FAA Accident Incident Data System Report No. AGL1314008
- 2.2 National Transportation Safety Board (NTSB) Preliminary Report CEN14LA241
- 2.3 FAA Advisory Circular AC 65-9A, Airframe and Powerplant Mechanics General Handbook, 1970
- 2.4 Standard Aviation Maintenance Handbook, 1975
- 2.5 Code of Federal Regulations
- 2.6 AIG Pilot Operator Aircraft Incident Report
- 2.7 N246AK Aircraft Maintenance Logbook
- 2.8 N246AK Engine Maintenance Logbook
- 2.9 Pilot Logbook of Daniel J. McGraw
- 2.10 N246AK Engine Log Entry dated 4/10/2014 by Superior Aviation, LTD.
- 2.11 N246AK Airframe Log Entry dated 4/10/2014 by Superior Aviation, LTD.
- 2.12 N246AK Propeller Log Entry dated 4/10/2014 by Superior Aviation, LTD.
- 2.13 Superior Aviation Work Order # M-30119 dated 12/10/2013
- 2.14 Superior Aviation Work Order # A-12570 dated 1/7/2014
- 2.15 FOIA Request letter and documents 2014-010248GL dated July 30, 2014
- 2.16 FOIA Request letter and documents 2014-010248F6 dated July 22, 2014
- 2.17 Marinette County Sheriffs Department Report, Case Number 2-14-001027
- 2.18 Lancair Pilot Operating Handbook and Airplane Flight Manual, Dec. 1994
- 2.19 Notes from my phone interview with Dan and Susan McGraw on 12/30/2014
- 2.20 Photos and videos of my December 16, 2014 inspection of the aircraft

## 3.0 BACKGROUND

The incident aircraft was originally supplied by Lancair International, Inc. (Lancair) as a kit and assembled by Arthur P. Kinsler. When the build process was complete, the aircraft was certificated by the Federal Aviation Administration in 1999 under the experimental amateur built (E-AB) category and registered as N246AK. It was powered by a Lycoming aircraft engine model IO360-B1B serial number L25925-51A.<sup>2</sup> Fuel is stored in two fuel bays, one in each wing. A right and left electric boost pump supplies fuel from its respective fuel bay to the firewall mounted sump through the fuel selector valve. The fuel leaves the sump and passes through a canister type fuel filter and into the firewall mounted electric fuel boost pump. This boost pump supplies fuel under pressure to the engine driven fuel pump mounted on the rear of the engine. Fuel is then pumped to the fuel control unit mounted on the underneath side of the engine. See figure A.

---

<sup>2</sup> N246AK Engine Maintenance Logbook.



**Figure A**

Daniel McGraw is an experienced FAA certificated commercial pilot and flight instructor with approximately 2800 total flight hours which includes 389 hours in the incident aircraft.<sup>3</sup> At the time of his crash, he was the owner and operator of the incident aircraft.

Superior Aviation (Superior) is an aviation services company based in Kingsford, Michigan and provides a variety of services to the aviation industry, including avionics, charter, flight training, aircraft maintenance and parts sales. According to their website, Superior is a FAA certified repair station with a class 3 airframe rating. Superior had been performing the maintenance including inspections on McGraw's aircraft including a annual / condition inspection completed and signed-off on February 7, 2014<sup>4</sup> and maintenance work signed off on April 10, 2014.<sup>5</sup>

#### **4.0 DESCRIPTION OF THE INCIDENT**

On April 11, 2014 Dan and Sue McGraw drove to Iron Mountain, Michigan where Dan picked up his aircraft, N246AK, from Superior Aviation after they had performed a condition / annual inspection and extensive maintenance and repairs. The work included repairs to the aircraft's fuel system. McGraw's aircraft had been in Superior's maintenance facility for several months while the work was being accomplished.

---

<sup>3</sup> AIG Pilot Operator Aircraft Incident Report

<sup>4</sup> N246AK Aircraft Maintenance Logbook entry dated February 7, 2014.

<sup>5</sup> N246AK Airframe Logbook Entry dated April 10, 2014.

McGraw flew his aircraft 1.9 hours from Iron Mountain, MI to his home airport in Oconto, WI with a stop in Menominee, MI. On April 24, he flew the aircraft 2.2 hours landing at two airports before returning to Oconto. His pilot logbook noted that air traffic control advised him that the Mode C was inoperative on his transponder.<sup>6</sup>

On the day of his crash, McGraw departed Oconto on his way to Iron Mountain, MI to discuss future maintenance with Superior. Between 10 and 15 minutes after departure from Oconto, McGraw smelled avgas fumes in the cockpit. He noted his fuel pressure was indicating zero. He turned on the fuel boost pump and the fuel pressure remained at zero and the engine was losing power. Unable to restore power to the engine, he executed an emergency landing in a plowed field near Crivitz, WI.

FAA Investigation report noted that "Investigation revealed no hose on the fuel pump going to the engine. After moving aircraft to hangar it revealed hose was attached to engine. Aircraft was just out of annual inspection its 2<sup>nd</sup> flight." It further states; "The fuel hose which goes from the fuel pump to the engine appears to only have been finger tightened."

## **5.0 INSPECTION**

I conducted an inspection of McGraw's aircraft on December 16, 2014 at Myers Aviation, Inc., 545 Aviation Road, Oshkosh, Wisconsin 54902. During my inspection, I took videos of and photo documented the aircraft. The engine driven fuel pump and a fuel hose assembly were found removed and laying in the pilot seat in the cockpit. The wings were removed and the wing skins or the fuel bays had been opened revealing the inside of each fuel bay. The top and bottom engine cowlings were removed and various fuel hoses were disconnected at one end.

I visually examined the fittings and B-nuts on each disconnected or loose fuel hose in the engine compartment as well as the hose assembly found in the pilot seat. All fittings and B-nuts examined exhibited no cracks, chaffing, thread damage, scoring or damage to the flares. With the exception of dirt and debris consistent with the aircraft crash landing in a plowed field, the fittings examined appeared to be serviceable.

## **6.0 ANALYSIS AND DISCUSSION**

McGraw was injured when he was unnecessarily and unreasonably exposed to the hazard of an unairworthy aircraft created by a loose fuel supply hose. The combination of hazard and exposure created an unreasonably dangerous condition for McGraw which caused his crash.

---

<sup>6</sup> Pilot Logbook of Daniel J. McGraw.



Based on over two decades of aircraft maintenance experience including checking thousands of aircraft hose fittings for proper torque during hundreds of annual inspections, I have found that aircraft fluid hose fittings that have been properly installed, torqued and inspected simply do not become loose and fall off within 5 flight hours of the annual inspection. In fact, the FAA mandates annual inspections be performed every 12 calendar months on aircraft, including McGraw's, to ensure their continued airworthiness. These annual inspections are called condition inspections on experimental aircraft and include checking fuel hose fittings for proper torque. Superior performed the last annual inspection on McGraw's aircraft and only 4.1 flight hours prior to his crash. Whether the fuel hose fittings were loose at the time McGraw delivered his aircraft to Superior for the annual inspection, or they were loosened by Superior during the course of their maintenance work, the fittings should have been properly inspected and torqued prior to Superior returning the aircraft to service. Daniel McGraw was injured as a result of Superior's failure to properly inspect and torque the loose fuel hose fittings on his aircraft and failure to return it to service in an airworthy condition.

Superior Aviation failed to properly inspect and torque the loose fuel hose fittings on McGraw's aircraft before returning the aircraft to service, which caused the fuel hose fitting to fall off during operation.

Had Superior Aviation conducted an adequate annual / condition inspection of McGraw's aircraft, the hazardous condition of the loose fuel supply hose would not have existed, and McGraw's crash would have been prevented.

Aircraft maintenance technicians and FAA certified repair stations have a responsibility and are under regulatory obligation to perform all aircraft maintenance in accordance with acceptable methods, techniques and practices:

***§43.13 Performance rules (general).***

- (a) Each person performing maintenance, alteration, or preventive maintenance on an aircraft, engine, propeller, or appliance shall use the methods, techniques, and practices prescribed in the current manufacturer's maintenance manual or Instructions for Continued Airworthiness prepared by its manufacturer, or other methods, techniques, and practices acceptable to the Administrator, except as noted in §43.16. He shall use the tools, equipment, and test apparatus necessary to assure completion of the work in accordance with accepted industry practices. If special equipment or test apparatus is recommended by the manufacturer involved, he must use that equipment or apparatus or its equivalent acceptable to the Administrator.*

(b) *Each person maintaining or altering, or performing preventive maintenance, shall do that work in such a manner and use materials of such a quality, that the condition of the aircraft, airframe, aircraft engine, propeller, or appliance worked on will be at least equal to its original or properly altered condition (with regard to aerodynamic function, structural strength, resistance to vibration and deterioration, and other qualities affecting airworthiness).*<sup>7</sup>

**§43.15 Additional performance rules for inspections.**

- (a) *General. Each person performing an inspection required by part 91, 125, or 135 of this chapter, shall –*
- (1) *Perform the inspection so as to determine whether the aircraft, or portion(s) thereof under inspection, meets all applicable airworthiness requirements*
- (c) *Annual and 100-hour inspections. (1) Each person performing an annual or 100-hour inspection shall use a checklist while performing the inspection. The checklist may be of the person's own design, one provided by the manufacturer or of the equipment being inspected or one obtained from another source. This checklist must include the scope and detail of the items contained in appendix D of this part and paragraph (b) of this section.*<sup>8</sup>

According to their maintenance work order, Superior states they used appendix D of part 43 as their inspection checklist:

“Annual Inspection. Annual Inspection completed IAW FAR 43, Appendix D. All appropriate torques, safety wire, anti-seizes & procedures used. See W/O M-30119 for detail of work performed.”<sup>9</sup>

14 CFR Part 43 Appendix D clearly states that the person performing the inspection must check nuts for improper torque and hoses, including fuel hoses, for looseness:

***Appendix D to Part 43—Scope and Detail of Items (as Applicable to the Particular Aircraft) To Be Included in Annual and 100-Hour Inspections***

(d) *Each person performing an annual or 100-hour inspection shall inspect (where applicable) components of the engine and nacelle group as follows:*

(2) *Studs and nuts—for improper torquing and obvious defects.*

(7) *Lines, hoses, and clamps—for leaks, improper condition and looseness.*

<sup>7</sup> Title 14 Code of Federal Regulations Part 43.13(a) and (b).

<sup>8</sup> Title 14 Code of Federal Regulations Part 43.15(a)(1) and (c).

<sup>9</sup> Superior Aviation Work Order # M-30119 dated 12/10/2013.



*(10) All systems—for improper installation, poor general condition, defects, and insecure attachment.*

Superior's failure to perform an adequate condition inspection of McGraw's aircraft in accordance with Federal Aviation Regulations denied McGraw the safety afforded him by those regulations and was a cause of his crash.

The aircraft kit manufacturer, Lancair, published an "Annual Type Condition Inspection" checklist in their Pilot Operating Handbook and Airplane Flight Manual dated December 1994. This checklist specifically calls for checking the condition and security of all fuel hoses and lines:

#### **ENGINE "GROUP B"**

14. Inspect fuel hoses for general condition.

#### **FUEL SYSTEM "GROUP E"**

4. Check fuel lines for security, chaffing, and leakage.

Superior's failure to perform an adequate condition inspection of McGraw's aircraft in accordance with Lancair's established inspection checklist created an unreasonably hazardous condition that was a cause of McGraw's crash.

As early as 1970, the administrator (FAA) has published various advisory circulars with specific guidance for aircraft technicians regarding installing and inspecting aircraft fuel hoses and lines. These advisory circulars (AC's) provide aircraft technicians with *methods, techniques and practices acceptable to the Administrator* and are readily available for reference, and are to be followed in the absence of specific guidance from the applicable manufacturer. FAA AC 43.13-1B states:

- 1. PURPOSE.** This advisory circular (AC) contains methods, techniques, and practices acceptable to the Administrator for the inspection and repair of non-pressurized areas of civil aircraft...<sup>10</sup>

Specific to inspections of fluid (fuel and hydraulic) lines and fittings:

---

<sup>10</sup> FAA AC 43.13-1B Acceptable Methods, Techniques, and Practices – Aircraft Inspection and Repair, September 8, 1998, p 3.

## SECTION 2. FUEL SYSTEMS

FUEL LINES AND FITTINGS. Additional inspection and repair practices for aircraft tubing systems may be found in the Chapter 9, Aircraft Systems and Components.<sup>11</sup>

## CHAPTER 9. SECTION 2. HYDRAULIC SYSTEMS

HYDRAULIC LINES AND FITTINGS. Carefully inspect all lines and fittings at regular intervals to ensure airworthiness. Inspect fittings and connections for leakage, looseness, cracks, burrs, or other damage.<sup>12</sup>

The importance of the proper torque applied to all nuts and fittings in a system cannot be over-emphasized. Too much torque will damage metal and seals, and too little torque will result in leaks and loose parts. The proper torque wrenches with the appropriate range should be used in assembling system units.<sup>13</sup> (Emphasis added)

Proper torque of fluid hose fittings is not left to chance in the aviation industry and must be verified during an annual inspection before returning the aircraft to service. Figure B shows a table listed in FAA AC 43.13-1B. Similar tables are listed in FAA AC 65.9A and the Standard Aviation Maintenance Handbook (Figure C).

TABLE 9-2. Tube data.

Dash Nos. Ref.	Tubing OD Inches	Wrench torque for tightening AN-818 Nut (pound inch)						Minimum bend radii measured to tubing centerline. Dimension in inches.	
		Aluminum-alloy tubing		Steel tubing		Aluminum-alloy tubing (Flare MS33583) for use on oxygen lines only			
		Minimum	Maximum	Minimum	Maximum	Minimum	Maximum	Alum. Alloy	Steel
-2	1/8	20	30	75	85	--	--	3/8	--
-3	3/16	25	35	95	105	--	--	7/16	21/32
-4	1/4	50	65	135	150	--	--	9/16	7/8
-5	5/16	70	90	170	200	100	125	3/4	1-1/8
-6	3/8	110	130	270	300	200	250	15/16	1-5/16
-8	1/2	230	260	450	500	300	400	1-1/4	1-3/4
-10	5/8	330	360	650	700	--	--	1-1/2	2-3/16
-12	3/4	460	500	900	1000	--	--	1-3/4	2-5/8
-16	1	500	700	1200	1400	--	--	3	3-1/2
-20	1-1/4	800	900	1520	1680	--	--	3-3/4	4-3/8
-24	1-1/2	800	900	1900	2100	--	--	5	5-1/4
-28	1-3/4	--	--	--	--	--	--	--	--
-32	2	1800	2000	2660	2940	--	--	8	7

<sup>11</sup> FAA AC 43.13-1B Acceptable Methods, Techniques, and Practices – Aircraft Inspection and Repair, September 8, 1998, p 8-383.

<sup>12</sup> FAA AC 43.13-1B Acceptable Methods, Techniques, and Practices – Aircraft Inspection and Repair, September 8, 1998, p 9-428.

<sup>13</sup> FAA AC 43.13-1B Acceptable Methods, Techniques, and Practices – Aircraft Inspection and Repair, September 8, 1998, p 9-427.

Figure B<sup>14</sup>

Fig. 6-22

**RECOMMENDED TORQUE VALUES FOR FLARED  
AND FLEX TUBING B-NUTS**  
Torque in Inch-Pounds\*

Nominal tube O.D. (in.)	6061-0 & 5052-0 aluminum alloy tubing		Flex hose assembly and 6061-T6 aluminum alloy tubing		Specification MIL-T-8845 stainless steel tubing (corrosion resistant)	
	Min	Max	Min	Max	Min	Max
1/8	20	25			35	40
3/16	25	35	30	70	90	140
1/4	40	65	70	120	135	185
5/16	60	80	70	120	180	230
3/8	75	125	130	180	270	345
1/2	150	250	300	400	450	525
5/8	200	350	430	550	650	750
3/4	300	500	650	800	900	1,100
1	500	700	900	1,100	1,200	1,400
1-1/4	600	900	1,200	1,450	1,500	1,800
1-1/2	600	900	1,550	1,850	2,000	2,300
1-3/4	700	1,000	2,000	2,300	2,600	2,900
2	800	1,100	2,500	2,900	3,200	3,600

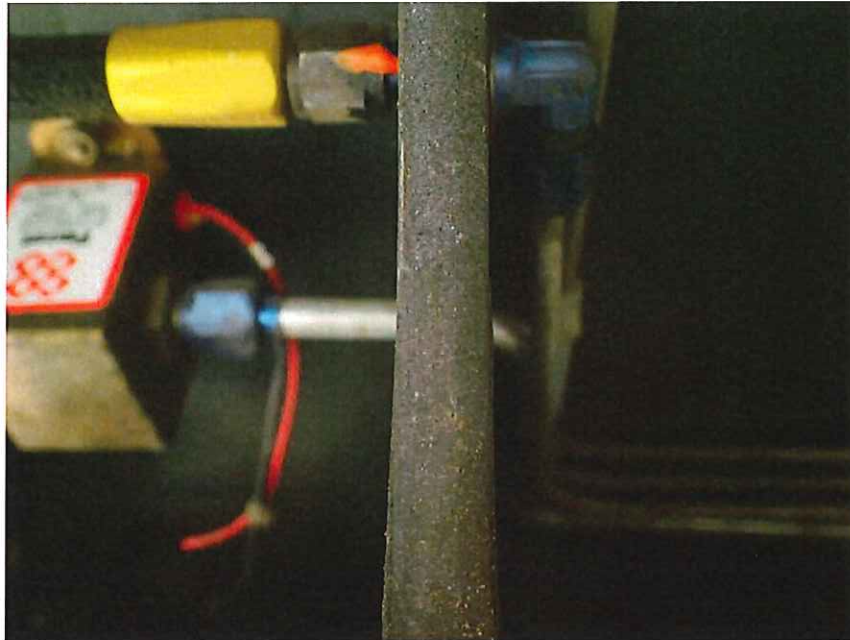
\*For combinations of materials or tempers, use the applicable values shown for the material of the tubing flare.

Figure C<sup>15</sup>

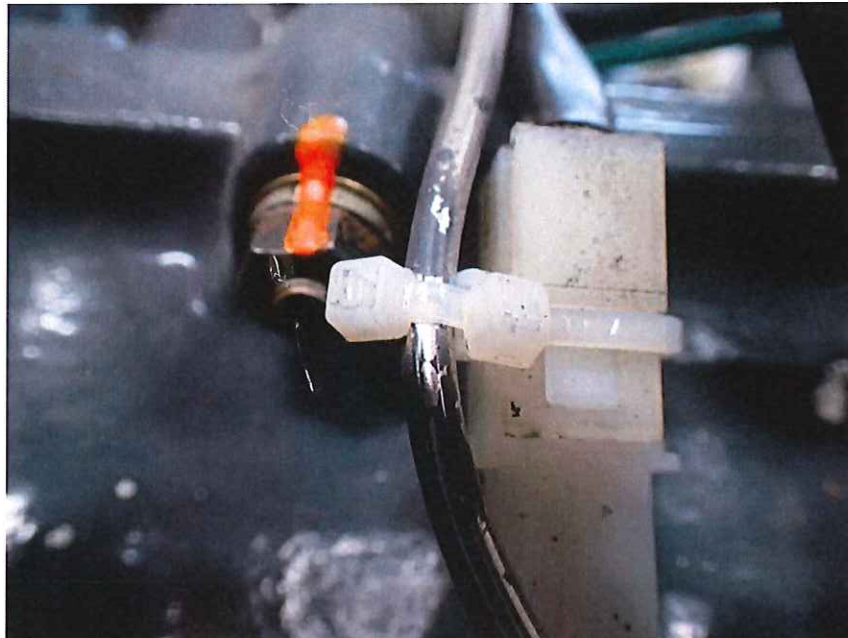
Fuel line fittings that are improperly torqued or only “finger tight” can *appear* to be properly tightened (torqued) and show no signs of leakage. The technician must check all fluid line fittings for improper torque and security. This can only be done with a calibrated torque wrench set to the proper range unless means is provided to visually verify that the fittings were torqued previously and have not rotated. One acceptable method used in the industry is to apply paint or other visual torque marking (often called inspector’s lacquer) across both the nut and the mating fitting after it has been torqued. If the visual torque markings are still aligned, the technician performing the inspection may use this indication as verification that the fitting has been properly torqued previously and has not loosened. Examples of this visual torque marking of fittings was observed as an orange torque mark on various nuts and hose fittings on McGraw’s aircraft during my inspection on December 16, 2014. See Figures E and F. Yet, the fuel hoses in the engine compartment between the engine and the fuel pump, did not exhibit any visual torque markings.

<sup>14</sup> FAA AC 43.13-1B Acceptable Methods, Techniques, and Practices – Aircraft Inspection and Repair, September 8, 1998, p 9-429.

<sup>15</sup> Standard Aviation Maintenance Handbook, 1975, p 6-27.



**Figure E**



**Figure F**

Superior Aviation's failure to adequately inspect and repair McGraw's aircraft during the condition inspection before returning it to service created an unreasonably dangerous condition that was a cause of McGraw's crash.



## 7.0 FINDINGS

To a reasonable degree of professional and technical certainty, and subject to change if additional information becomes available, it is my opinion that:

- 7.1 Superior Aviation failed to properly inspect and torque the loose fuel hose fittings on McGraw's aircraft before returning the aircraft to service, which caused the fuel hose fitting to fall off during operation.
- 7.2 Had Superior Aviation conducted an adequate annual / condition inspection of McGraw's aircraft, the hazardous condition of the loose fuel supply hose would not have existed, and McGraw's crash would have been prevented.
- 7.3 Superior's failure to perform an adequate condition inspection of McGraw's aircraft in accordance with Federal Aviation Regulations denied McGraw the safety afforded him by those regulations and was a cause of his crash.
- 7.4 Superior's failure to perform an adequate condition inspection of McGraw's aircraft in accordance with Lancair's established inspection checklist created an unreasonably hazardous condition that was a cause of McGraw's crash.
- 7.5 Superior Aviation's failure to adequately inspect and repair McGraw's aircraft during the condition inspection before returning it to service created an unreasonably dangerous condition that was a cause of McGraw's crash.

Respectfully submitted,



Matthew D. Lykins AP, IA

# Robson Forensic

Engineers, Architects, Scientists & Fire Investigators

## MATTHEW D. LYKINS Aviation and Mechanical Expert

Experienced in safe private and commercial operations, management, training, maintenance, modification, troubleshooting, repair, overhaul, upgrade and certification, of both fixed-wing and helicopter aircraft and their equipment and systems.

**Aircraft (Airframe) Inspections, Operations, Repair, Maintenance, Troubleshooting, Recertification:** Airframe electrical including lighting and caution and warning systems, landing gear systems including electrical, hydraulic, emergency extension systems, flight controls systems – manual, electrical, and hydraulic including proper installation and rigging, structural repair processes – sheet metal, wood and composites, breathing oxygen systems, cabin pressurization systems, cabin heating, cooling, and ventilation. Aircraft refueling operations, de-fueling, fuel sampling and testing for contamination / quality, fueling safety procedures and standards.

**Aircraft (Power Plant) Inspections, Operations, Repair, Maintenance, Troubleshooting, Recertification:** Engine electrical and electrical power generation and control, engine ignition systems, engine mechanical, engine fuel scheduling and management systems including carburetors, fuel injection, turbo-charging, turbine engine hydro-mechanical and electronic fuel controls, engine oil systems, engine cooling systems, engine induction and exhaust, auxiliary power units (turbine), propeller and governor systems including feathering and reversing systems, engine and airframe fire detection and extinguishing systems including continuous loop type and High Rate of Discharge (HRD) extinguishing systems, low-thrust detection and warning systems on multi-engine aircraft, propeller and rotor dynamic balancing.

**Aircraft (Avionics / Electronics) Inspections, Operations, Repair, Maintenance, Troubleshooting, Recertification:** Avionics, digital flight instrumentation, integrated navigation / communication systems, GPS, auto-pilot systems, electronic engine monitoring and management systems including FADEC, glass cockpit.

**Material Handling / Lift Equipment:** Safety inspections, operations, repair, maintenance, and troubleshooting of hydraulic and pneumatic systems, components, and controls, guards and safety features, on lift vehicles including lift trucks, lift gates, loading dock levelers, forklifts, fork trucks, scissor lifts, pallet jacks, and boom lifts.

**Agricultural Machinery / Grain Elevator Equipment:** Machinery and equipment failures and malfunctions. Agricultural accidents and farm operation issues. Safety inspections, operations, repair, maintenance, and troubleshooting of heavy duty tractors, tillage discs, harvesters, plows, cultivators, mowers, gravity wagons, grain trucks and trailers, grain augers, drills, planters, sprayers and grain elevator dumps, pits, scales, legs, augers, bin sweeps, grain dryers, feed grinders and hammer mills.



# Robson Forensic

Engineers, Architects, Scientists & Fire Investigators

## MATTHEW D. LYKINS Aviation and Mechanical Expert

**Tools:** Hydraulic jacks and lifts, hoists and slings, raised work stands, engineered work platforms, ladders, bench grinders, rotary pneumatic drills, drill presses, impact wrenches, welders - acetylene, Metal Inert Gas (MIG), Tungsten Inert Gas (TIG), pneumatic rivet guns, compression testers, multi-meters, crimpers, band-saws, lathes, hydraulic presses.

**Technical / Vocational Training and Teaching:** Classroom lecture / instruction, shop / lab training and supervision, tool equipment usage training and evaluation, shop floor safety, school lab and shop safety, student progress and evaluation, engine start-up and operation training, test administration, student advisement, course development, Federal Aviation Administration (FAA) approved training program development.

**Safety Procedures and Requirements:** Shop floor safety, development and enforcement of safety policies and procedures, material safety data sheets (MSDS), right-to-know, lockout / tag-out, operational guards, caution and warning signs, instruction manuals, training, airport ramp and ground operations procedures including aircraft towing and tow vehicles, ground support vehicles, baggage handling equipment, jet-ways, air-stairs, single point and over-wing refueling equipment, flight line operations procedures including aircraft marshalling and signaling during day and night conditions, aircraft run and taxi, flight line maintenance operations, and maintenance flight procedures, forklifts, forklift operations, material handling.

**Certification Processes:** FAA Certified Repair Station (Part 145), FAA Certified Air Carrier (Part 135 / 121), FAA Certified Airframe and Power-Plant Technician School (Part 147), FAA Designated Mechanic Examiner – testing for and issuing of FAA aircraft mechanic certificates.

**Inspection and Testing:** Non-destructive Examination (NDE) / Non-destructive Testing (NDT), aircraft inspection programs – annuals, 100 hour, progressive, FAA Approved Aircraft Inspection Programs (AAIP), altimeter, pitot-static and transponder tests and inspections, emergency locator beacon (ELT) tests and inspections, pre-purchase evaluations, special flight permit (ferry permit) inspections.

## PROFESSIONAL EXPERIENCE

2010 to present     **Robson Forensic, Inc.**  
*Associate*

Provide technical investigations, analysis, reports, and testimony toward the resolution of commercial and personal injury litigation involving maintenance shops, associated tooling and equipment, aircraft ground operations, training and technical school environment, aircraft systems and product failure analysis.

# Robson Forensic

Engineers, Architects, Scientists & Fire Investigators

## MATTHEW D. LYKINS Aviation and Mechanical Expert

- 2015 to present     **Matthew Avionics Testing & Technical Support, LLC** Stevensville, MT  
*Owner / Accountable Manager*  
FAA certified repair station specialized in avionics systems tests, inspections and re-certifications.  
Provide in-field technical support to helicopter and fixed-wing operators including wildfire helitack, aerial utility crews and aerial spraying operators in remote locations.
- 2014 to present     **ARGUS International, Inc.** Greenwood Village, CO  
*Aviation Safety Auditor*  
Conduct worldwide IS-BAO (International Standard for Business Aircraft Operations) audits of domestic and international business aviation operators.  
Conduct worldwide ARGUS audits of domestic and international business aviation operators
- 2009 to present     **Matthews Aerospace Training and Technical Support (M.A.T.T.S.),** Franklin, IN  
*Founder and President*  
Consulting, Training (DME), and Aircraft Maintenance Services
- Develop and consult aerospace company management on 14 CFR 145 FAA certified repair station application process, which includes Statement of Compliance, Repair Station Manual, Quality Control Manual, Training Program, and all repair station forms and instructions for use of each form.
  - Provide expert technical and flight support for real-time in-flight emergencies involving aircraft mechanical failures directly affecting the safe termination of a flight. (24/7 availability) This includes direct communication in real-time with FAA air traffic controllers, the flight crew on board the affected aircraft, aircraft manufacturer technical support staff, as well as direct airborne support as necessary to evaluate the extent of the problem and assist the pilot in command in executing all possible procedures to get the aircraft on the ground safely.
  - Provide aircraft maintenance facilities, repair personnel, and aircraft owners with critical troubleshooting and repair support and training as necessary for unusual failures on the various aircraft systems.
  - Perform pre-purchase evaluations on aircraft prior to a sales transaction. This includes mechanical, operational, flight, and documentation evaluations, which are all detailed on a pre-purchase evaluation report that is provided to the perspective buyer and the seller.
  - Apply for and obtain from the FAA special flight permits for aircraft needing flown to another location for necessary maintenance affecting airworthiness. Inspect these aircraft for safe flight under the permit. Fly the aircraft under the permit to the maintenance location as needed.

**MATTHEW D. LYKINS**  
**Aviation and Mechanical Expert**

- Consult aircraft owners and operators on technical matters including special maintenance items and equipment upgrades to their aircraft. This often includes a feasibility study.
- As a FAA Designated Mechanic Examiner for the past 12 years, provide FAA testing and final evaluation of Airframe and Power Plant Mechanic applicants. Issue FAA Form 8040-4 Temporary Airmen Certificate to those who successfully complete the testing process.

2009 to present     **Aviation Institute of Maintenance, Indianapolis, IN**  
*Instructor, Airframe and Power Plant*

Teach as an aviation technical instructor for the following subject areas for a FAA Approved Part 147 school. This includes training through lecture, lab projects and research on theory, application, operation, fabrication, repair, overhaul, troubleshooting, inspection, standards of airworthiness, major and minor repair design of airframes, power plants, and systems, major and minor alterations of airframes, power plants, and systems, failure prediction and forecasting, identification and reporting of faults, malfunctions, failures, and design defects:

- A. Basic Electricity, both AC and DC theory
- B. Aircraft Drawings and Blueprints
- C. Weight and Balance
- D. Fluid Lines and Fittings
- E. Materials and Processes
- F. Ground Operations and Servicing
- G. Cleaning and Corrosion Control
- H. Mathematics
- I. Maintenance Forms, Records, and Federal Aviation Regulations
- J. Physics
- K. Maintenance Publications
- L. Aviation Mechanic Privileges and Limitations
- M. Wood Structures
- N. Aircraft Coverings
- O. Aircraft Finishes
- P. Sheet-Metal and Non-Metallic Structures
- Q. Welding
- R. Assembly and Rigging
- S. Airframe Inspection and Troubleshooting
- T. Aircraft Landing Gear Systems
- U. Hydraulic and Pneumatic Power Systems
- V. Cabin Atmosphere Control Systems
- W. Aircraft Instrument Systems
- X. Communication and Navigation Systems
- Y. Aircraft Fuel Systems
- Z. Aircraft Electrical Systems
- AA. Position and Warning Systems

# Robson Forensic

Engineers, Architects, Scientists & Fire Investigators

## MATTHEW D. LYKINS Aviation and Mechanical Expert

BB. Ice and Rain Control Systems  
CC. Fire Protection Systems  
DD. Reciprocating Engines Theory and Operation  
EE. Turbine Engines Theory and Operation  
FF. Engine Inspection and Troubleshooting  
GG. Engine Instrumentation Systems  
HH. Engine Fire Protections Systems  
II. Engine Electrical Systems  
JJ. Lubrication Systems  
KK. Ignition and Starting Systems  
LL. Fuel Metering Systems  
MM. Engine Fuel Systems  
NN. Induction Systems  
OO. Engine Cooling Systems  
PP. Engine Exhaust and Turbo-Charging Systems  
QQ. Propellers  
RR. Turbine Powered Auxiliary Power Units

1999 to 2009     **Skyward Air Service, LLC**, Seymour, IN  
*Founder and President*

- Acquired FAA Part 135 Air Carrier Certification, Director of Maintenance for Part 91 and Part 135 aircraft
  - Aircraft acquisitions
  - Maintenance Program development and implementation
  - Pilot and crew hiring, training, evaluation, scheduling
  - Managing personnel issues and concerns
  - Marketing charter business
  - Coordinating all aspects of the charter business with the FAA including FAA inspections and audits
  - Developed and implemented FAA Drug and Alcohol Abatement Program
- Acquired FAA Part 145 Repair Station Certificate
  - Equipment acquisitions and calibration tracking
  - Personnel hiring, training, and development
  - Pitot-Static, transponder, and altitude reporting equipment tests and inspections as a repairman with return-to-service authorization
- Performed avionics and instrumentation system upgrades.
- Troubleshoot electronic, navigation, communication, engine monitoring systems including airframe electrical systems on aircraft.
  - All Cessna single-engine and multi-engine piston aircraft
  - All Piper single-engine and multi-engine piston aircraft
  - All Beechcraft single-engine and multi-engine piston aircraft
  - All Grumman single-engine piston aircraft
  - All Mooney single-engine piston aircraft

**MATTHEW D. LYKINS**  
**Aviation and Mechanical Expert**

- Bellanca Viking series aircraft
- All American Champion aircraft
- All Diamond DA20, DA40, and DA42 diesel aircraft
- Cirrus single-engine piston aircraft
- Various experimental / homebuilt single-engine piston aircraft
- Cessna Citation 500, 501, and Bravo turbine aircraft
- Lear 24, 25, 35 turbine aircraft
- Beechcraft King Air 90, 100, and 200 turboprop aircraft
- Bell 47 piston helicopter
- Bell 206 turbine helicopter
- Coordinated maintenance scheduling with aircraft owners/operators and the maintenance department.
- Built job estimates for scheduled, unscheduled, and upgrade maintenance projects.
- Managed maintenance projects from start to finish.
- Performed pre-purchase evaluations on all aircraft listed in paragraph (f) above for perspective buyer anywhere in the U.S.
- Performed annual, 100 hour, progressive, daily, and phase inspections (as required) on aircraft listed above.
- Performed the required repairs and servicing (including major airframe and power plant repairs and alterations) to aircraft listed above.
- Developed and enforced company policy and procedures.
- Provided consulting services to airport management regarding security, emergency procedures, standards, and events.
- Managed aircraft fueling operations including fuel farm operations and maintenance, filtration, fuel quality and purity testing and monitoring, refueling equipment operations and maintenance, training fueling and line personnel in policy, procedures, safety, quality and standards for aircraft refueling operations.

1999 to **American Trans Air, Indianapolis, IN**

2000 *Instructor, Maintenance Training*

Provided on-site advanced training to line and overhaul technicians at Indianapolis and out-stations regarding the Boeing 757, Boeing 727, and Lockheed L-1011. Developed new courses for advanced composite structural repairs to the Boeing 727, 757, and Lockheed L-1011 aircraft.

1998 to **American Trans Air Training Academy, Indianapolis, IN**

1999 *Instructor*

Aviation technical instructor for the following subject areas for a FAA Approved Part 147 school. This included lecture, labs, research projects, and troubleshooting scenarios with class sizes ranging from 5 to 25 students.

# Robson Forensic

Engineers, Architects, Scientists & Fire Investigators

## MATTHEW D. LYKINS Aviation and Mechanical Expert

1995 to **Aero Tech, Inc.**, Danville, KY

1998 *A&P Mechanic*

Serviced, repaired, rebuilt, and maintained general aviation aircraft under part 91 and 135. Performed daily aircraft refueling operations including fuel farm operations, refueling safety and emergency procedures, single point and over-the-wing refueling of fixed-wing and rotorcraft, fuel sampling and quality testing and record keeping.

1985 to **Lykins Farms**

1995 *Agriculture Heavy Equipment Operation, Maintenance, Safety*

- Partnership grain farming operation with father. Grain enterprise included 2000+ acres of corn / soybeans and family owned and operated grain elevator with a focus on specialty mixes of livestock feeds and supplements. Operated, serviced, repaired, rebuilt, and maintained heavy duty tractors, tillage discs, harvesters, plows, cultivators, mowers, gravity wagons, grain trucks and trailers, grain augers, drills, planters, sprayers in addition to smaller miscellaneous farm tools and equipment.
- Managed the safe transport, control, and application of herbicides, pesticides, and fertilizers including ammonium nitrate.
- Operated and maintained center-pivot irrigation systems including on-site diesel power generators and corner design systems.
- Grain elevator maintenance and safety inspections of dumps, pits, scales, legs, augers, bin sweeps, grain dryers, feed grinders and mills.

## PROFESSIONAL CREDENTIALS

Infrared Thermographer – Level 1 Certification April 2012

Society of Professional Rope Access Technicians – Level 1 Certification March 2012

FAA Repairman Certification, 2005-2009

FAA Designated Mechanic Examiner, since 1998

FAA Inspection Authorization, since 1997

FAA Mechanic Airframe and Power plant, since 1990

FAA Pilot Certificate, since 1990

Commercial rating

Instrument

Multi-engine

High performance endorsement

Over 1500 flight hours logged

## EDUCATION



# Robson Forensic

Engineers, Architects, Scientists & Fire Investigators

## MATTHEW D. LYKINS Aviation and Mechanical Expert

Bachelor of Science, Aviation Maintenance Technology, Purdue University, 1995  
Minor: Composite Technology; Minor: Management/Supervision  
Associate of Science, Aviation Maintenance Technology, Vincennes University, 1991  
FAA Airframe and Power-plant Certificate with Inspection Authorization

### PROFESSIONAL MEMBERSHIPS

Lawyer-Pilots Bar Association  
Aircraft Owners and Pilots Association  
Experimental Aircraft Association

### AWARDS

FAA Maintenance Technician of the Year 2005

### INVITED TALKS

Maintaining GA Aircraft – By the Book?, Lawyer Pilots Bar Association, Summer meeting 2012, Williamsburg, VA

### PUBLICATIONS

Lykins, M.D., *Keep Those Ole Magnetos Flying*, Lawyer Pilots Bar Association Journal (Winter 2012)  
Lykins, M.D., *What's A FAA Form 337? I'm the Owner – Not an Aircraft Mechanic*, Lawyer Pilots Bar Association Journal (Fall 2012)

### OTHER

Eagle Scout, 1988  
Missionary Service, 1991-1993  
Bi-lingual: English and Spanish

**MATTHEW D. LYKINS**

**FOUR YEAR TESTIMONY HISTORY**

---

Cindy Cunningham, as personal representative of the estate of Robert Cunningham, deceased v. Global Aviation, LLC; Estate of Armando Motta, deceased; and Frank Marsico; 2009-9258-CI-21, State of Florida in the Sixth Judicial Circuit Court for the County of Pinellas

**Deposition: August 14, 2012**

Everette Brown and Katia Brown v. Southeastern Aerial Crop Service, Inc.; 562012-CAD-002470, State of Florida in the Nineteenth Judicial Circuit Court of St. Lucie County

**Deposition: September 5, 2013**

Brock Gaudreault v. Elite Line services, LLC, G&T Conveyor Company, Inc.; 12-CV--01177 JNE/JJG, United States District Court District of Minnesota

**Deposition: January 8, 2014**

Jennifer Albright, Individually AND as Administratrix of the Estate of Timothy Albright AND as Mother and Next Friend of Kailey Albright v. Alliance Coal, LLC, et al. and Warrior Coal, LLC and Alliance Coal, LLC vs. General Mine Contracting, Inc. and Cincinnati Insurance Company and Levee Lift, Inc. and Equipment Depot Kentucky, Inc. v. Troy Patterson and Matrix Design Group, LLC; 09-CI-1318 Consolidated with 10-CI-171 and 10-CI-446, Commonwealth of Kentucky Hopkins Circuit Court, Div 1 Madisonville, Kentucky

**Deposition: January 10, 2014**

AIG Europe Limited, f/k/a AIG UK Limited and Qatar Airways, Q.C.S.C. v. Gate Gourmet, Inc.; 2013-08229, State of Virginia in the Circuit Court of Fairfax County

**Deposition: January 14, 2014**

Willie Aviata vs. C&S Wholesale Grocers, Inc.; 11-1-0740-04 VLC, State of Hawaii in the Circuit Court of the First Circuit

**Deposition: April 18, 2014**

Equal Employment Opportunity Commission, and Safia Abdulle Ali, et. al vs. Jetstream Ground Services, Inc.; Civil Action No. 13-CV-02340-CMA-KMT; In the United States District Court for the District of Colorado.

**Deposition: October 24, 2014**

Dawn Workman vs. Executive Flight, Inc.; 13---2---00458---2, Superior Court of Washington for Douglas County

**Deposition: March 31, 2015**

**Trial: April 17, 2015**

**Robson Forensic**  
Engineers, Architects, Scientists & Fire Investigators

Gloria Rodgers, Administrator of the Estate of John Rodgers vs. AWB Industries, Inc d/b/a Aircraft Tool Supply Company, McFarlane Aviation Inc.; 1:14-CV-00605-RBP; In the U.S. District Court for the Northern District of Alabama, Eastern Division.

**Deposition: March 3, 2016**

Jonathan Appling vs. Aggregate Machinery, Inc., and Does 1 to 25; No. RG13707789; Superior Court of the State of California County of Alameda.

**Deposition: April 15, 2016**

**Robson Forensic**  
Engineers, Architects, Scientists & Fire Investigators